

N-Channel Enhancement Mode Power MOSFET

Description

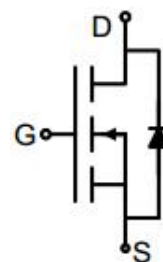
The GT043N15Q uses advanced trench technology to provide excellent $R_{DS(ON)}$, low gate charge. It can be used in a wide variety of applications.

General Features

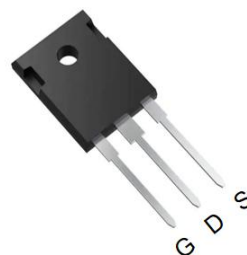
- V_{DS} 150V
- I_D (at $V_{GS} = 10V$) 180A
- $R_{DS(ON)}$ (at $V_{GS} = 10V$) < 5m Ω
- 100% Avalanche Tested
- RoHS Compliant

Application

- Power switch
- DC/DC converters



Schematic diagram



TO-247

Ordering Information

Device	Package	Marking	Packaging
GT043N15Q	TO-247	GT043N15	30pcs/Tube

Absolute Maximum Ratings $T_C = 25^\circ\text{C}$, unless otherwise noted

Parameter	Symbol	Value	Unit
Drain-Source Voltage	V_{DS}	150	V
Continuous Drain Current	$T_C = 25^\circ\text{C}$	180	A
	$T_C = 100^\circ\text{C}$	114	
Pulsed Drain Current (note1)	I_{DM}	720	A
Gate-Source Voltage	V_{GS}	± 20	V
Power Dissipation	P_D	290	W
Single pulse avalanche energy (note2)	E_{AS}	676	mJ
Operating Junction and Storage Temperature Range	T_J, T_{stg}	-55 To 150	$^\circ\text{C}$

Thermal Resistance

Parameter	Symbol	Value	Unit
Thermal Resistance, Junction-to-Ambient	R_{thJA}	62	$^\circ\text{C/W}$
Thermal Resistance, Junction-to-Case	R_{thJC}	0.43	$^\circ\text{C/W}$

Specifications $T_J = 25^\circ\text{C}$, unless otherwise noted

Parameter	Symbol	Test Conditions	Value			Unit
			Min.	Typ.	Max.	
Static Parameters						
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	$V_{GS} = 0V, I_D = 250\mu A$	150	--	--	V
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS} = 150V, V_{GS} = 0V$	--	--	1	μA
Gate-Source Leakage	I_{GSS}	$V_{GS} = \pm 20V$	--	--	± 100	nA
Gate-Source Threshold Voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D = 250\mu A$	2.0	2.8	4.0	V
Drain-Source On-Resistance	$R_{DS(on)}$	$V_{GS} = 10V, I_D = 90A$	--	3.9	5.0	m Ω
Forward Transconductance	g_{FS}	$V_{GS} = 5V, I_D = 90A$	--	69	--	S
Dynamic Parameters						
Input Capacitance	C_{iss}	$V_{GS} = 0V,$ $V_{DS} = 75V,$ $f = 1.0MHz$	--	5050	--	pF
Output Capacitance	C_{oss}		--	740	--	
Reverse Transfer Capacitance	C_{rss}		--	55	--	
Total Gate Charge	Q_g	$V_{DD} = 75V,$ $I_D = 90A,$ $V_{GS} = 10V$	--	75	--	nC
Gate-Source Charge	Q_{gs}		--	30	--	
Gate-Drain Charge	Q_{gd}		--	17	--	
Turn-on Delay Time	$t_{d(on)}$	$V_{DD} = 75V,$ $I_D = 90A,$ $R_G = 2.7\Omega$	--	22	--	ns
Turn-on Rise Time	t_r		--	60	--	
Turn-off Delay Time	$t_{d(off)}$		--	59	--	
Turn-off Fall Time	t_f		--	28	--	
Drain-Source Body Diode Characteristics						
Continuous Body Diode Current	I_S	$T_C = 25^\circ C$	--	--	180	A
Body Diode Voltage	V_{SD}	$T_J = 25^\circ C, I_{SD} = 90A, V_{GS} = 0V$	--	--	1.4	V
Reverse Recovery Charge	Q_{rr}	$I_F = 90A, V_{GS} = 0V$ $di/dt = 100A/us$	--	323	--	nC
Reverse Recovery Time	T_{rr}		--	100	--	ns

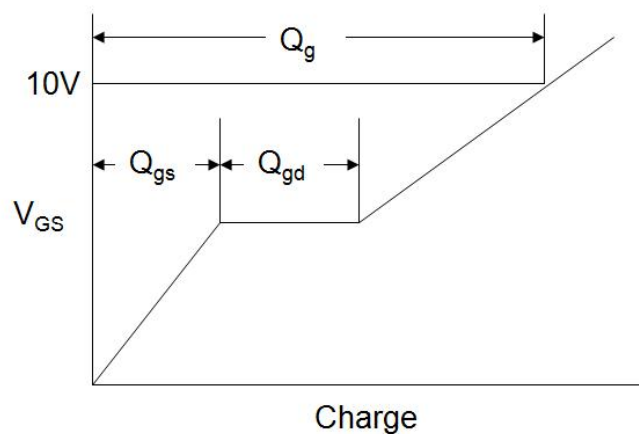
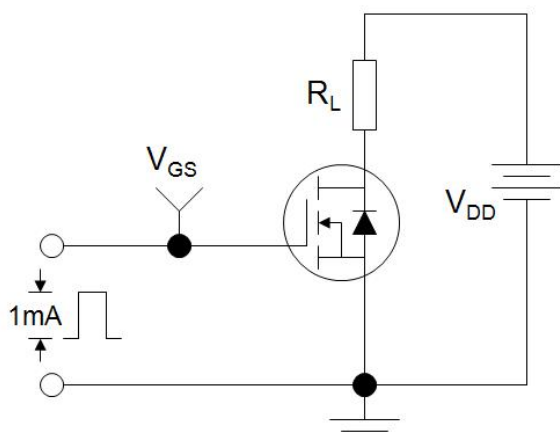
Notes

1. Repetitive Rating: Pulse width limited by maximum junction temperature
2. EAS condition : $T_J = 25^\circ\text{C}$, $V_{DD} = 50V$, $V_{GS} = 10V$, $L = 0.5mH$, $R_g = 25\Omega$

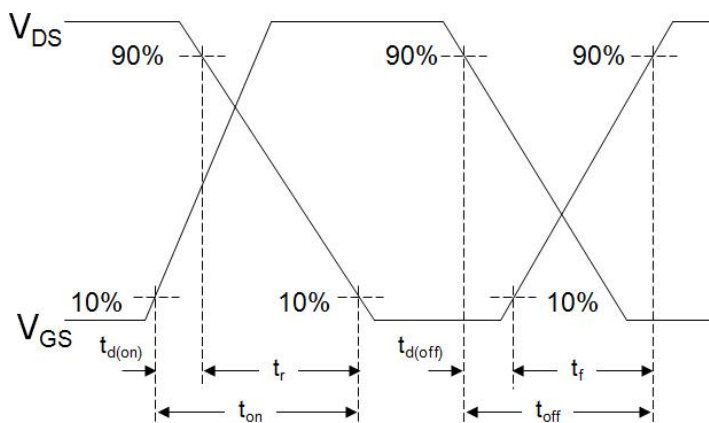
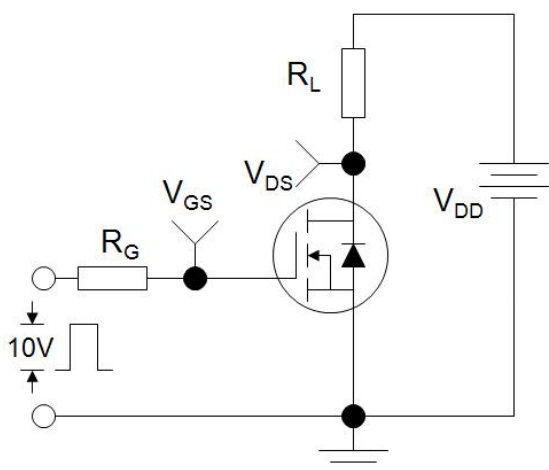
The table shows the minimum avalanche energy, which is 1849mJ when the device is tested until failure

3. Identical low side and high side switch with identical R_G

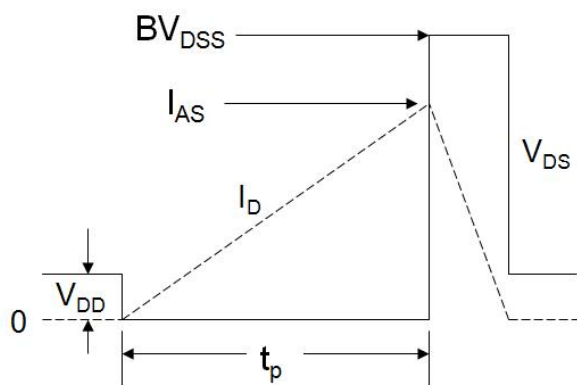
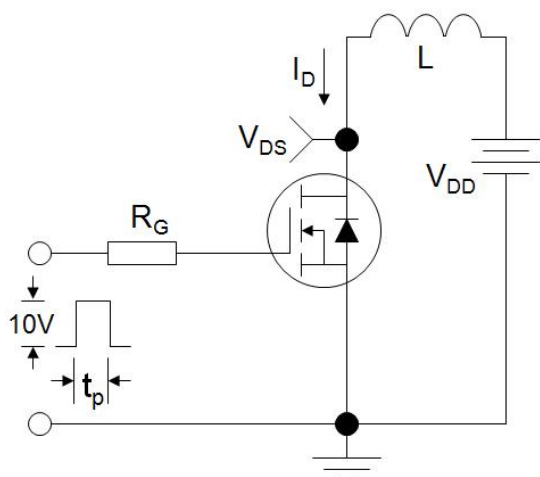
Gate Charge Test Circuit



Switch Time Test Circuit



EAS Test Circuit



Typical Characteristics $T_J = 25^\circ\text{C}$, unless otherwise noted

Figure 1. Output Characteristics

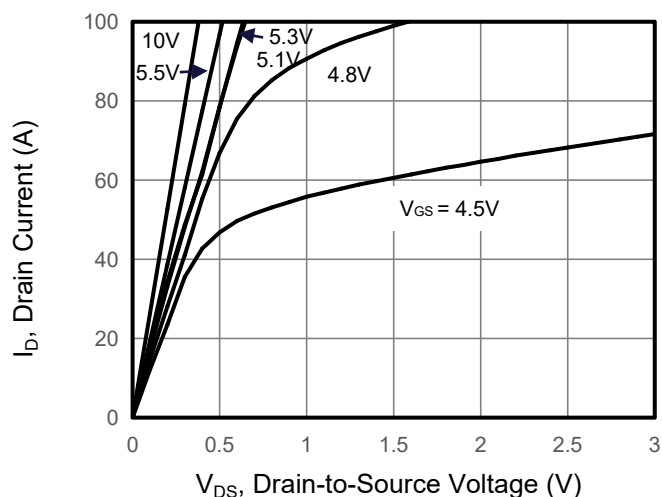


Figure 2. Transfer Characteristics

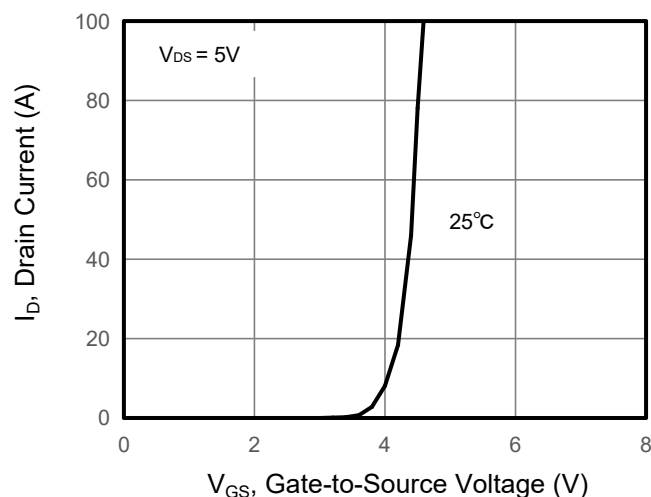


Figure 3. Drain Source On Resistance

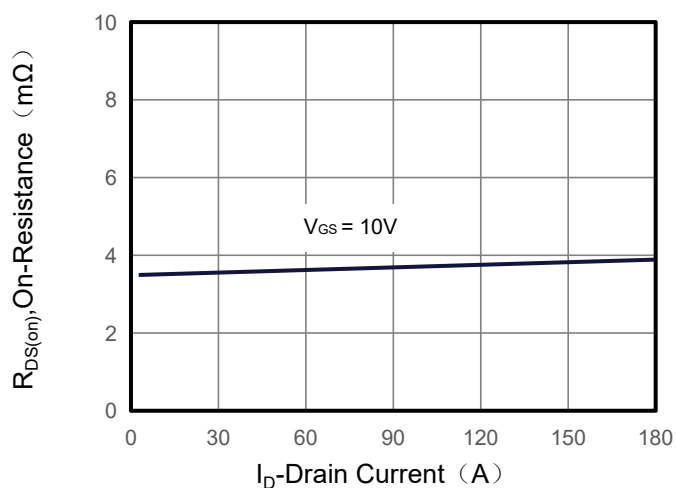


Figure 4. Gate Charge

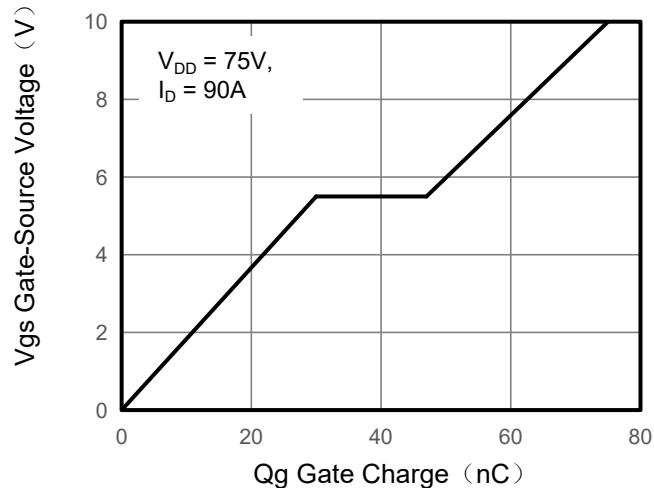


Figure 5. Capacitance

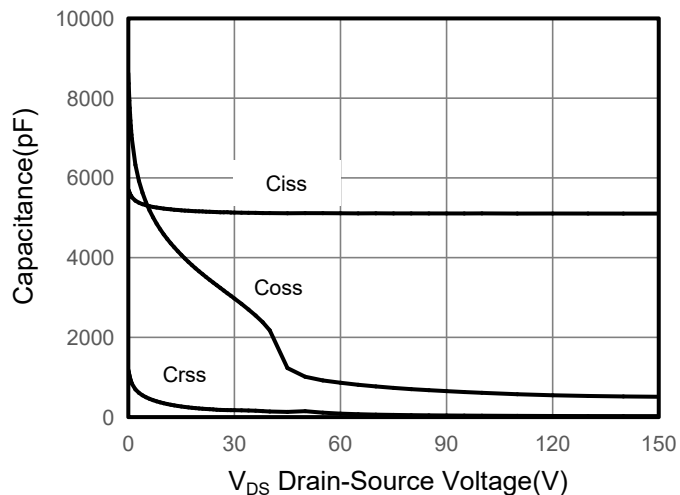
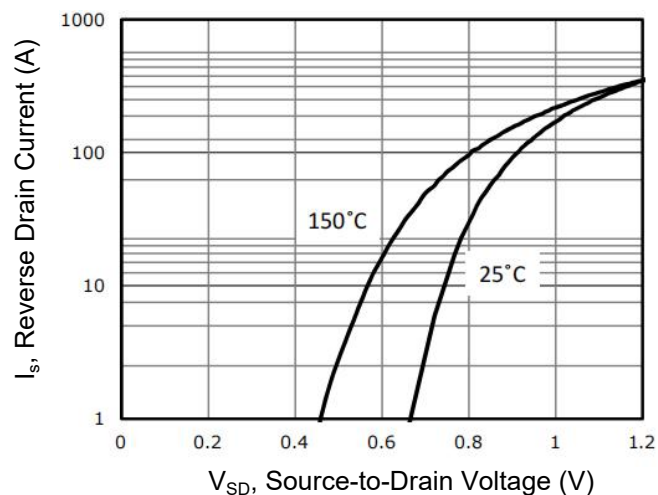


Figure 6. Source-Drain Diode Forward



Typical Characteristics $T_J = 25^\circ\text{C}$, unless otherwise noted

Figure 7. Drain-Source On-Resistance

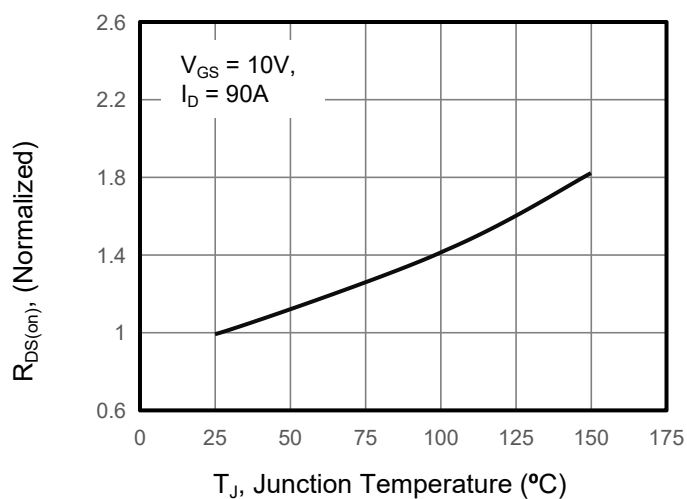


Figure 8. Safe Operation Area

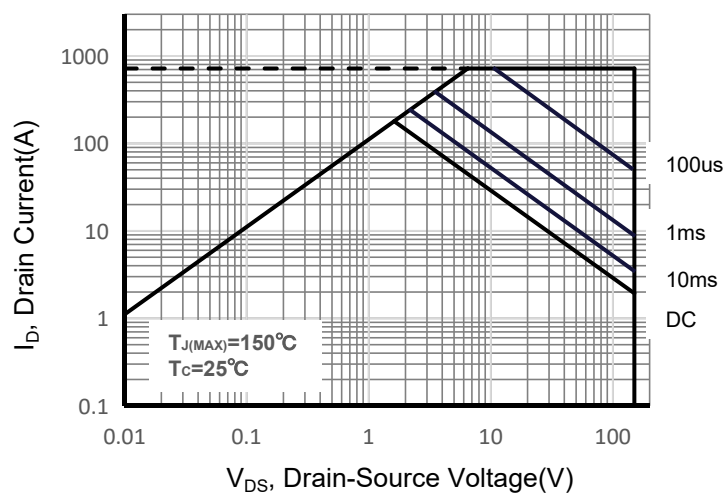


Figure 9. Maximum Continuous Drain Current vs Case Temperature

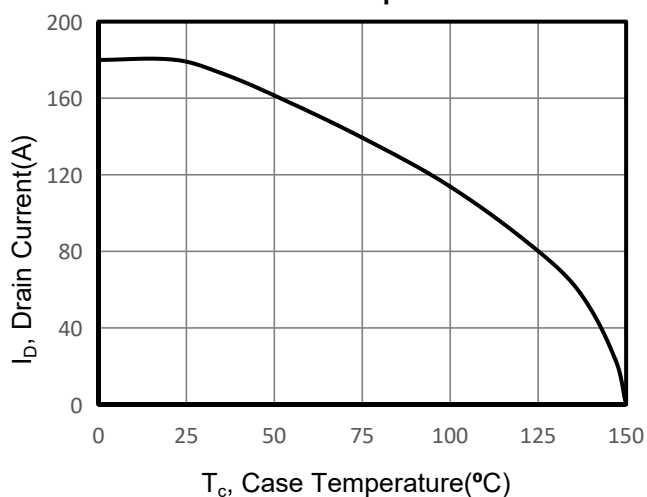
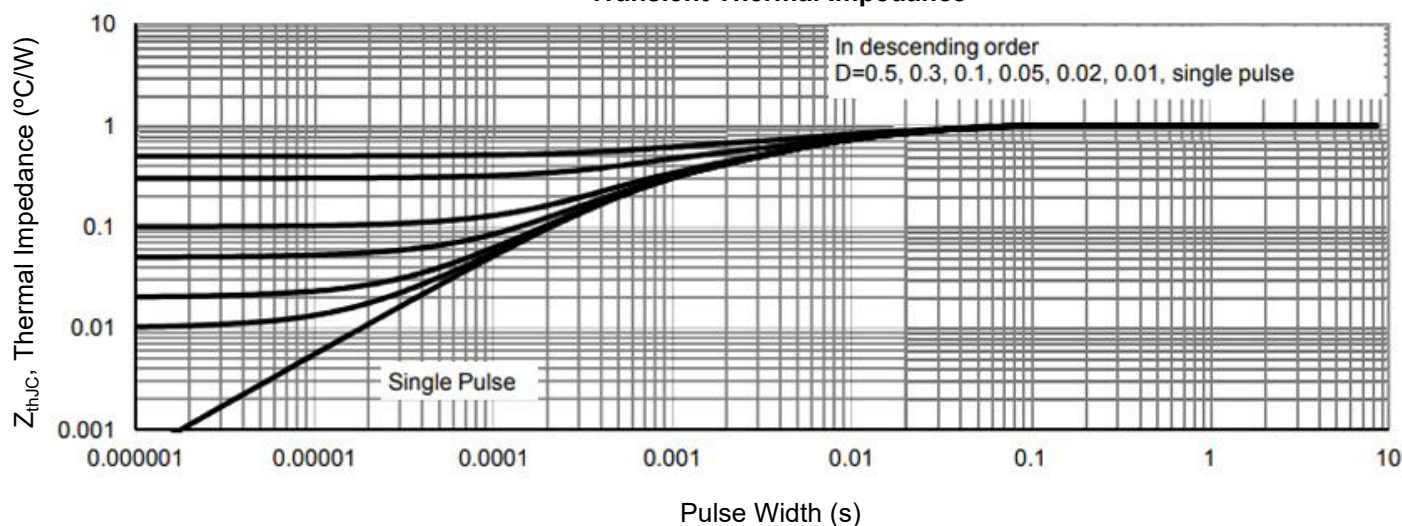
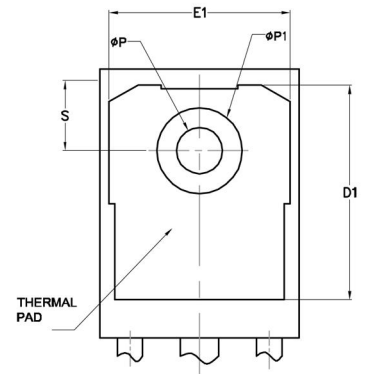
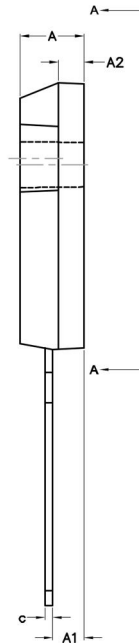
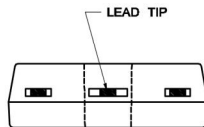
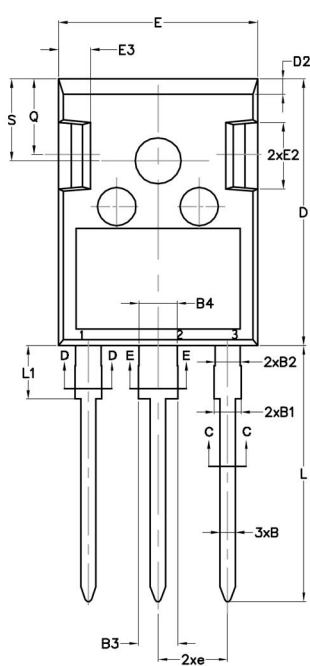


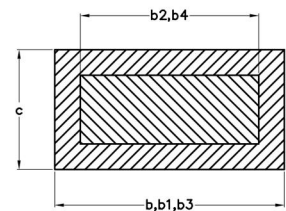
Figure 10. Normalized Maximum Transient Thermal Impedance



TO-247 Package Information



VIEW A-A



SECTION C-C, D-D, E-E

SYMBOLS	DIMENSIONS			
	mm		inch	
	MIN.	MAX.	MIN.	MAX.
A	4.85	5.15	0.191	0.203
A1	2.25	2.55	0.088	0.100
A2	1.85	2.15	0.073	0.085
B	1.04	1.33	0.041	0.052
B1	1.90	2.35	0.075	0.093
B2	1.90	2.15	0.075	0.085
B3	2.90	3.35	0.114	0.132
B4	2.90	3.15	0.114	0.124
c	0.55	0.68	0.022	0.027
D	20.8	21.10	0.819	0.831
D1	16.25	17.65	0.640	0.695
D2	0.95	1.35	0.037	0.053
E	15.70	16.10	0.618	0.634
E1	13.50	14.20	0.531	0.559
E2	3.80	5.00	0.150	0.197
E3	1.00	2.6	0.039	0.102
e	5.46BSC		0.215BSC	
L	19.80	20.3	0.779	0.799
L1	4.00	4.50	0.157	0.177
φP	3.50	3.70	0.138	0.145
φP1	—	7.19	—	0.291
Q	5.40	6.00	0.212	0.236
S	6.2BSC		0.244BSC	